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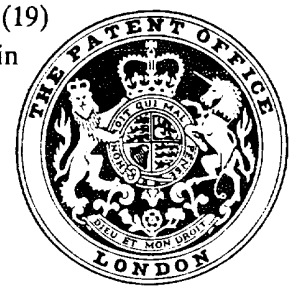

(54) APPARATUS FOR EMPTYING A MOBILE CONTAINER

(71) We, ZÖLLER-KIPPER G. m. b. H., a German limited liability company, of Hans-Zöller-Strasse 50-68, 6500 Mainz 43, Federal Republic of Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The invention relates to apparatus for emptying a mobile container which has at least one pair of wheels, into a collecting container, for example for emptying a rubbish container into a rubbish cart, the apparatus having a tipping frame on which a container is carried between two support and tipping arms and which is fitted with securing devices and a support for the container.

Apparatus for emptying mobile bulk rubbish containers into rubbish carts, in which a bulk rubbish container to be emptied is carried between two support and tipping arms on a tipping frame, and is secured by claw-catch elements on laterally projecting axle ends or on handles, are already known (see German Specification No. 1 226 036). Similar apparatus for emptying mobile bulk rubbish containers is also known in which the support and tipping arms of the tipping frame which grip the container engage under an upper, flange-type container rim.

Also apparatus for emptying rubbish bins is known in which the tipping frame has hooks over which loop-type handle elements of a rubbish bin are hooked. Finally, apparatus for emptying a rubbish bin is also known which has a frame on which the lower edge of the bin can engage, and securing elements which engage the upper edge of the bin.

However, rubbish containers of the rubbish bin type with a capacity of 110 litres and 200 litres have recently become known, which have two wheels on the lower terminal section of their rear wall. Normally these containers stand on their lower edge. However, if they are tipped backwards they can be moved barrow-wise on the wheels. Since the wall of these containers which have become available is thin, and generally consists of plastic material, no special elements are included on them in which the securing devices used on the emptying appliances until now can engage.

An object of the invention is to provide apparatus for emptying a mobile container having at least one pair of wheels, with which such a container can be held securely and without damage during emptying, and in which insertion of the container to be emptied and removal of the emptied container can be easily carried out.

According to this invention there is provided apparatus for emptying a mobile container which has at least one pair of wheels, into a collecting container, for example for emptying a rubbish container into a rubbish cart, the apparatus having a tipping frame on which a container is carried between two support and tipping arms and which is fitted with securing devices and a support for the container, wherein the support and tipping arms of the tipping frame are designed to engage laterally over the lower part of the container, a pivotable reception pocket being arranged at the free end of each support and tipping arm, each pocket being adapted to take a container wheel and to act as a securing device for the container, the support for the upper part of the container wall opposite the wheels being arranged on the tipping frame.

Also according to this invention there is provided apparatus for tipping a container which has two wheels, for example for emptying a dust bin into a dust cart, the apparatus including a frame member or members, two pockets turnably mounted on the frame member or members, and a

abutment for the container on the frame member or members, each pocket being constructed and arranged so that a respective wheel can be moved into, and be retained in, the pocket.

Thus a container to be emptied receives no other loading in the tipping frame than it also receives during wheeling of the container, and there is no danger of damage to the container wall, even if this is relatively thin and lightweight, and if it is made of plastics material. The pivoting reception pockets for the container wheels offer in addition secure locking of the container in the tipped position, and also secure holding of the container in the tipping frame in all the intermediate positions.

The reception pockets can be designed to encompass the wheels, at least partially, and to have a flat surface which rests on the floor when the tipping frame is in its initial position ready for moving in the wheels. This makes it possible for the container to be inserted particularly simply and easily in the tipping frame, in that it is simply wheeled on its wheels into the reception pockets. Here it is an advantage if the reception pockets have a pocket floor which is curved out in the sector of a circle away from the generally planar side wall which rests on the floor, and an open upper side which lies towards the back in the initial position of the tipping frame, where the reception pockets can be pivoted around a common axis which is parallel to the pivoting axis of the tipping frame, this axis being arranged at a greater distance from the floor of the pocket than the amount of the radius of the largest container wheel which the pocket is able to contain. The container wheels can be rolled quickly and safely into such a pocket and are also held securely in the pocket in every tipping position of the tipping frame, without any kind of closing or locking device being required.

The pivoting range of the reception pockets relative to the associated support and tipping arms can be restricted in such a way that in operation the reception pockets can be pivoted back and forth from their initial position relative to the support and tipping arms only with the front part upwards. This prevents the reception pockets from carrying out a pivoting movement downwards right at the beginning of the tipping movement, and then having to pivot back in the upper part of the tipping movement. On the contrary, the tipping movement of the reception pockets is restricted in this way to the range required for the secure locking of the container wheels. For this restriction a limiting stop can be fitted on the reception pockets to act in conjunction with the support and tipping frame or with a counter-stop fitted thereon. This limiting stop and/or counter-stop can be adjustable.

A further additional security measure which is particularly effective at the commencement of the upwards tipping movement and at the end of the downwards tipping movement can be provided if the side wall of the reception pocket which rests on the floor has a back-stop in the form of an upwards projecting strip which has to be run over by the relevant wheel. Further, the reception pocket can be designed with an insertion slope for the relevant wheel on the side wall which lies at the top in the initial position of the tipping frame, and preferably also on the outer end wall. In this way the insertion of the wheels into the reception pocket is made considerably easier.

It is also possible for the distance between the support and tipping arms which hold between them the container to be emptied to be adjustable to the axial distance between the wheels of the different containers. This makes it possible to empty containers of various widths with the same apparatus. For this purpose a pivoting lever fitted with guide rods, for example, can be provided, which sets a greater distance between the support and tipping arms in one end position and reduces the distance in the other end position. With sufficiently exact adjustment of the distance between the support and tipping arms it is possible to construct the reception pockets relatively simply, for example with an outer end wall and a strip which runs round the edge of this end wall on three sides to form the pocket side walls and the floor of the pocket.

The rest for the upper part of the container wall is designed preferably so that it can roll, being for example, in the form of a rotatable roller or cylinder. In this way deformation of the container wall over this rest during pivoting movement of the reception pockets is avoided.

The invention will now be described by way of example, with reference to the drawings, in which:-

Figure 1 shows apparatus according to the invention with a rubbish container, in the initial position;

Figure 2 shows the apparatus with the rubbish container in a tipped position at about 3/4 height with the tipped position of the pivot arm and the reception pocket shown in dashes at about half height;

Figure 3 shows the apparatus with the rubbish container in the terminal tipped position;

Figure 4 shows a modified embodiment, without the rubbish container, looking towards the back;

Figure 5 is a section of the reception pocket along the line V - V in Figure 1;

Figure 6 shows a modified embodiment of the reception pocket in a similar view to that

shown in Figure 5.

Referring to the drawings, the apparatus of the invention is provided for emptying a rubbish container 1 of a kind which has become known recently, and which has a pair of wheels 2 in the lower terminal section of its rear wall. By this means such a rubbish container can be wheeled barrow-wise in a slightly backwards tilted position on its wheels 2. Such rubbish containers 1 are available in two sizes, namely, a somewhat wider construction having a capacity of 220 litres and a somewhat narrower construction with a capacity of 110 litres.

In the apparatus of the invention, in the embodiments shown the tipping frame is formed by two support and tipping arms 3 which are positioned at the upper end on a pivot shaft 4. This pivot shaft 4 lies in the vicinity of the actual loading apparatus which is only represented by its sheet-metal deflector 5 for the rubbish to be loaded into a rubbish cart.

The support and tipping arms 3 are designed so that they extend laterally over the lower part of the rubbish container 1, and each have on their free end a reception pocket 6 for a container wheel 2. Each of these reception pockets 6 is mounted on the end of the relevant support and tipping arm 3 so that it can pivot around an axis 7, where this tipping axis 7 of the two reception pockets 6 should follow a straight line as far as possible.

In the upper region between the two support and tipping arms 3 a rotatable cylinder-type rest 8 is arranged, on which the upper part of that container wall 9 of the rubbish container which is opposite to the wheels 2 rests upon insertion in the tipping frame.

The two reception pockets 6 are designed to encompass partially the wheels 2. For this purpose they have a closed outer end wall 11 (see Figures 4 and 6) and a wall strip 12 which runs part of the way round the circumferential edge of this end wall 11. In this way a reception pocket 6 comprises a side wall 12a which rests on the floor, a pocket base 12b curving out away from this in the approximate shape of semicircle, and a pocket top 12c. The side of the reception pocket 6 which is at the back in the initial position is open. As can be seen from Figures 1 to 3, 5, 6 the pivot axis 7 is displaced backwards relative to the centre of curvature of the pocket base 12b, this being by a distance which corresponds approximately to the curvature radius of the pocket base 12b. Thus the distance between the pocket pivot axis 7 and the pocket base 12b is always greater than the radius of the larges container wheel 2 which the pocket 6 can contain, the distance corresponding approximately to the diameter of the largest wheel 2 which the pocket 6 can contain. As Figures 5 and 6 show, on the outer face of the pocket end wall 11 a bearing flange 13 is arranged which houses rotatably an axle journal 14 attached in the end of the relevant support and tipping arm 3, but prevents its axial escape.

In the examples shown, an insertion slope 15 is constructed in the end wall 11 of the pocket and an insertion slope 16 is constructed in the top 12c of the pocket in the vicinity of the open rear face of each reception pocket 6. On the generally planar side wall 12a of the pocket in the vicinity of the open rear face of the pocket a back-stop 17 is constructed in the form of a bar which the relevant wheel 2 has to run over.

In addition, lying opposite the end wall 11 and running the length of the wall strip 12, the reception pockets 6 can also have a flange 18 which engages between the relevant wheel 2 and the rubbish container 1. This is particularly important when the support and tipping arms 3 can be adjusted laterally, in order to prevent the support and tipping arms 3 from moving outwards as the container 1 is inserted, when the wheels 2 could escape from the reception pockets 6.

Stops 19 for limiting the pivoting movement are fitted on the reception pockets 6. In Figures 1 to 3 such a stop 19 is shown drawn in heavily in a possible mounting position. With this mounting arrangement the reception pocket 6 can pivot out from the initial position shown in Figure 1 downwards through an angle α relative to the relevant support and tipping arms 3 until the limiting stop 19 comes to rest on the relevant support and tipping arm.

However, a mounting position is also shown at 19', drawn in more lightly, in which the limiting stop 19' already rests on the relevant support and tipping arm 3 in the initial position. The first possibility offers the advantage that the reception pocket 6 assumes a sloping position immediately the support and tipping arms 3 are pivoted upwards, and affords greater security against the running back of the wheels 2. However, it must be borne in mind that during downwards pivoting the reception pocket 6 comes to rest not with its generally planar side wall 12a, but with the lower rear region of the pocket base 12b on the floor, and must then slide some way over the floor until it has reached the initial position shown in Figure 1. The second possibiltiy afforded by the arrangement of the limiting stop 19' makes it possible to dispense with the first downwards pivoting movement of the reception pocket 6 so that the inclination of the planar side wall 12a towards the base 12b of the pocket increases according to the upwards pivoting of the support and tipping arms 3. Thus after downwards pivoting the

reception pocket rests with its planar side wall 12a on the floor.

As shown in Figure 3, on the end wall of the reception pocket 6 another terminal limiting stop 20 can be fitted, which rests on the support and tipping arm 3 when the tipping frame moves into the upper terminal section of its tipped position. As can be seen from Figure 3, this can occur even before reaching the actual upper terminal position. This additional terminal stop 20 prevents the reception pocket 6 from being able to carry out a rocking movement with the rubbish container 1 contained in it in the upper tipping position of the tipping frame.

As Figure 4 shows, the tipping frame can be designed with lateral adjustment of the support and tipping arms 3 and the reception pockets 6 fitted to them. This makes it possible with appropriate adjustment to use one and the same appliance to empty both the above-mentioned wider and also the narrower rubbish containers. The support and tipping arms 3 are seated for this purpose with their upper end axially adjustable on the pivot shaft 4 by means of eyes 21. The pivot shaft 4 can be designed as a splined shaft or a toothed shaft in order to transmit the turning moment to the support and tipping arms 3. However, to transmit the turning moment in the example shown it is sufficient to provide permanently attached to the pivot axis 4 a transmission plate 22, which bears at the lower end a transmission rod arrangement 23 extending between the two support and tipping arms 3.

This transmission rod arrangement is formed as a guide and transmission sleeve 24 attached to the lower end of the transmission plate 22 with associated rods 25 inserted axially moveable in it. In the vicinity of these rods 25 guide rod levers 26 act on the two support and tipping arms 3. At their inner end these guide rod levers 26 are hinged on a crank lever 27, which is itself mounted pivotably on the sleeve 24 and has an actuating arm 28.

The rest 8 in this example is formed by a shortened rest roller 29, into which an axle journal 30 from each support and tipping arm 3 engages coaxially and which is axially movable.

Figure 4 shows the apparatus set for a wider rubbish container 1. To change over to a narrower rubbish container the hand lever 28 has only to be swung to the right as shown in Figure 4. This draws the two support and tipping arms 3 into their position corresponding to the narrower rubbish container.

The operating sequence of the apparatus is as follows:

After the tipping frame has been set with the hand lever 28 to the size of the relevant rubbish container 1 to be emptied, the rubbish container 1 is wheeled like a barrow, i.e. by the wall lying opposite to the wall 9 (see Figure 1), forwards in between the support and tipping arms 3 with the wheels in the reception pockets 6, until the wheels have run over past the strip-shaped back-stop 17. The rubbish container is then moved from the barrow-like backwards tilted position into the normal perpendicular position, in which it then lies with the wall 9 which lies opposite to the wheels 2 resting on the rest rod or rest cylinder 8, as shown in Figure 1. In this initial position the tipping appliance which acts on the pivot shaft 4 is operated. The support and tipping arms 3 then pivot upwards. If the limiting stop 19 on the reception pockets 6 is in the position 19, then the reception pocket 6 carries out a counter pivoting movement during the first part of the upwards pivoting movement of the tipping frame, and slides with its side wall 12a and the pocket base 12b over the ground until the limiting stop 19 comes to rest on the support and tipping arm 3. From this moment on (with the arrangement of the limiting stop at 19', from the beginning on) the reception pockets 6 carry out an upwards movement together with the support and tipping arms 3, which is comparable to that of a dredger bucket. This common movement continues until approximately the middle tipping position shown in dashes in Figure 2. (With the arrangement of the limiting stop 19' it continues until a somewhat higher tipping position). From then on the limiting stop 19 or 19' lifts up again from the support and tipping arm 3 in order to pivot upwards relative to the support and tipping arm 3. This relative pivoting movement of the reception pockets 6 continues until the terminal limiting stops 20 come to rest against the support and tipping arm 3 and then compel the support and tipping arm 3 and reception pocket 6 to carry out a common pivoting movement again. In this way rocking movements of the rubbish container 1 suspended by the reception pockets 6 on the support and tipping arms 3 are prevented, and the impact which is important for emptying the rubbish container and releasing the contents of the container is transmitted to the rubbish container 1 by the striking of the tipping frame against its terminal stop in the terminal tipping position.

When the tipping frame is pivoted back, the sequence of movements described above runs in reverse. The rubbish container 1 is again set down safely on the ground. With the limiting stop arranged at 19, during the last part of the downwards pivoting movement a sliding movement of the curved pocket base over the ground is carried out, which does not occur with the arrangement

of the limiting stop at 19'. The choice of the arrangement of the limiting stop at 19 or 19' can be made according to the circumstances at the time. However, it is also possible to provide an adjustable limiting stop of this type, for example, with the possibility for adjustment between the positions 19 and 19' shown.

The displacement movement of the front wall 9 of the container relative to the rest 8 which occurs during the upwards and downwards pivoting of the apparatus due the the pivoting movement of the reception pockets 6 relative to the support and tipping arms 3 can be made completely safe for the apparatus and for the rubbish container by constructing the rest 8 as a rotatable roller or cylinder which revolves against the front wall 9 of the container during this displacement.

WHAT WE CLAIM IS:-

1. Apparatus for emptying a mobile container which has at least one pair of wheels, into a collecting container, for example for emptying a rubbish container into a rubbish cart, the apparatus having a tipping frame on which a container is carrges cied between two support and tipping arms and which is fitted with securing devices and a support for the container, wherein the support and tipping arms of the tipping frame are designed to engage laterally over the lower part of the container, a pivotable reception pocket being arranged at the free end of each support and tipping arm, each pocket being adapted to take a container wheel and to act as a securing device for the container, the support for the upper part of the container wall opposite the wheels being arranged on the tipping frame.

2. Apparatus according to claim 1, wherein each reception pocket is adapted to encompass a respective wheel at least partially, and has a planar side which rests on the ground in position for insertion of the wheel in the initial position of the tipping frame.

3. Apparatus according to claim 2, wherein each reception pocket has a pocket base which curves out in the sector of a circle from the generally planar side wall which rests on the ground, and an open upper side which lies towards the rear in the initial position of the tipping frame, each reception pocket being pivotable around a common axis parallel to the pivot axis of the tipping frame, the common axis being at a greater distance from the base of the pocket than the radius of the largest container wheel which the pocket can take.

4. Apparatus according to claim 3, wherein the distance between the pocket pivot axis and the base of the pocket corresponds substantially to the diameter of the largest container wheel which the pocket can take.

5. Apparatus according to claim 3 or claim 4, wherein the pivot range of each reception pocket relative to the support and tipping arm is limited so that in operation it can be pivoted forward and back from its initial position relative to the support and tipping arm only with its front part upwards.

6. Apparatus according to claim 5, wherein a limiting stop is attached to each reception pocket and acts in conjunction with the support and tipping arm or with a counter stop attached thereto.

7. Apparatus according to claim 6, wherein the limiting stop and/or the couter stop can be adjusted.

8. Apparatus according to any of claims 2 to 7, wherein, in the vicinity of the entrance to each pocket, that side wall of the pocket which rests on the ground, has an upwards projecting back-stop in the form of a strip, over which the relevant wheel runs.

9. Apparatus according to any of claims 2 to 8, wherein each reception pocket has an insertion slope for the relevant wheel on the side wall or top which lies at the top in the initial position of the tipping frame, and also on the outer end wall.

10. Apparatus according to any of claims 1 to 9, wherein the distance between the support and tipping arms which receive between them the container can be adjusted to the axial distance between the wheels of different containers.

11. Apparatus according to any of claims 2 to 10, wherein each reception pocket is formed by an outer end wall and a wall strip which runs round the circumferential edge of the end wall on three sides, forming pocket side walls and a pocket base.

12. Apparatus according to any of claims 1 to 11, wherein the rest for the upper part of the container wall is constructed so that it can roll being in the form of a rotatable roller or cylinder.

13. Apparatus for tipping a container which has two wheels, for example for emptying a dust bin into a dust cart, the apparatus including a frame member or members, two pockets turnably mounted on the frame member or members, and an abutment for the container on the frame member or members, each pocket being constructed and arranged so that a respective wheel can be moved into, and be retained in, the pocket.

14. Apparatus for tipping a container, the apparatus being constructed and arranged substantially as herein described and shown in the drawings.

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Fig. 1

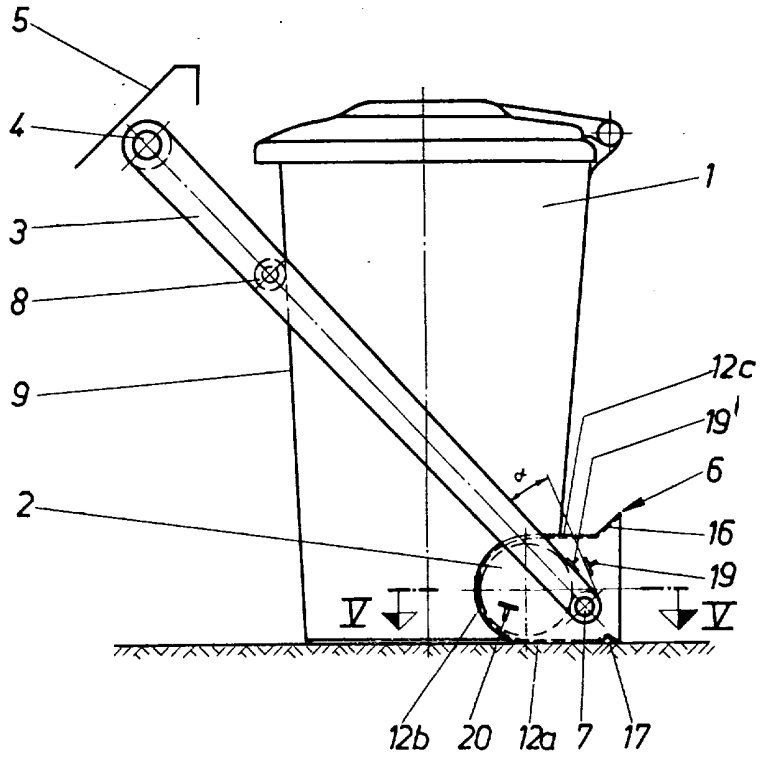

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Fig. 2

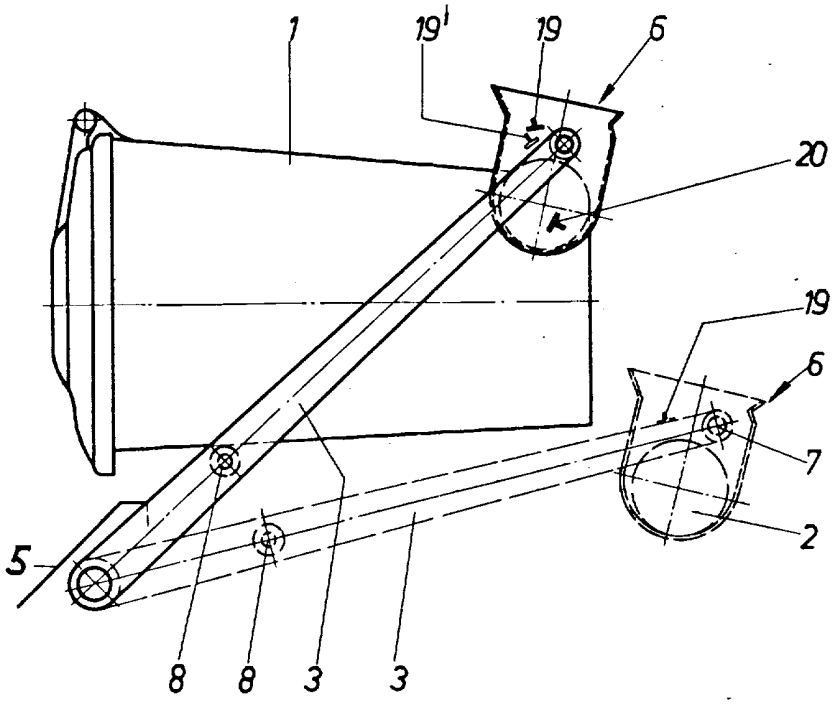

Fig. 3

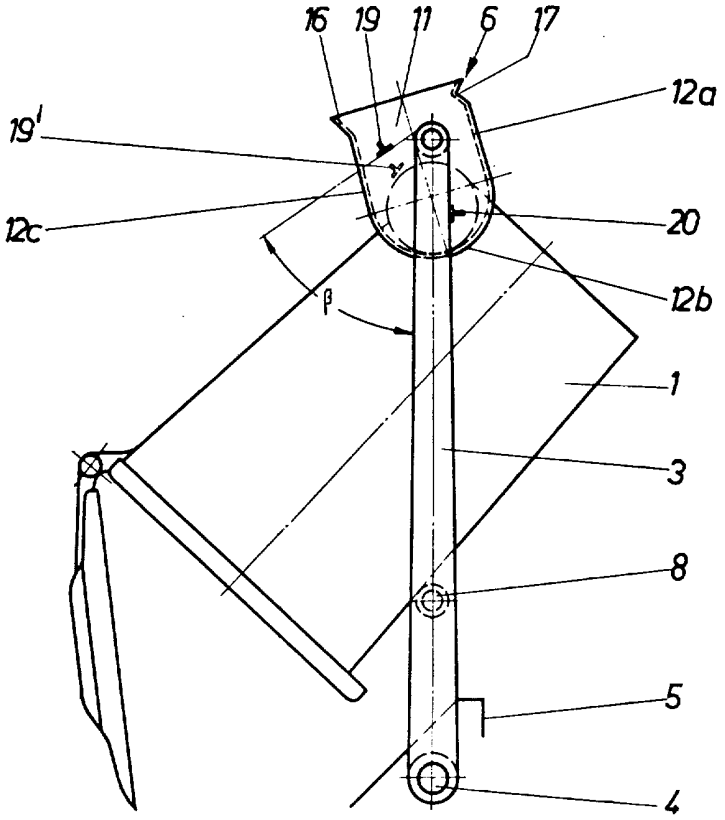

Fig. 4

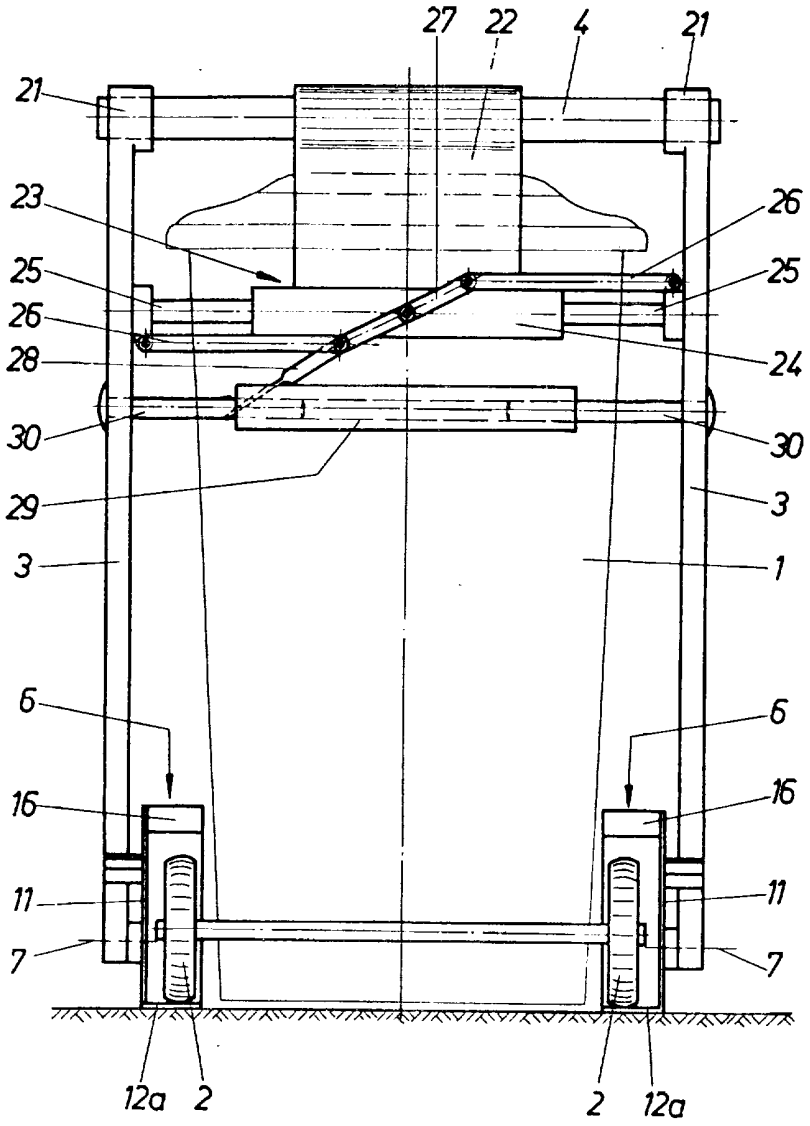
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Fig. 5

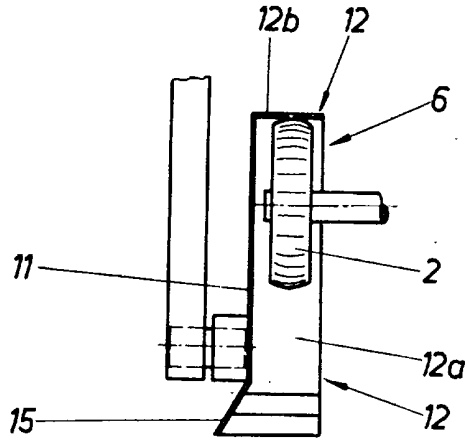

Fig. 6